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Weekly Surveyor

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WEEKLY SURVEYOR

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USSR AND EASTERN EUROPE

The Soviets are having problems producing TV tubes. [REDACTED]

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[REDACTED]

There are indications that the Soviets have maintained behavioral control over dolphins working untethered in open ocean for the first time. This open ocean work may have been associated with initial stages of an operational Soviet Navy dolphin program. [REDACTED]

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CEMA (Council for Mutual Economic Assistance) is facilitating technological cooperation among its members by establishing international associations for planning, developing, manufacturing and marketing of engineering products. CEMA countries can be expected to become more active in their collective and individual S&T dealings with other nations, if not more competitive.

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Three papers presented at the scientific sessions of the Joint Scientific Council, Academy of Sciences, USSR, held in Moscow, December 1973, are further indications of fairly recent, openly acknowledged Soviet interest in actively compensating sounds emitted by and reflected from underwater objects, [REDACTED]

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Characteristics of vertical arrays of hydrophones for both isotropic and anisotropic ambient noise fields were described in Soviet open literature. [REDACTED]

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[REDACTED]

Soviet scientists are continuing research on ferroelectric lead-barium-niobate in an effort to produce high quality acoustic power transducers. [REDACTED]

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[REDACTED] The Soviet have continued to use outmoded materials and lead-

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barium-niobate would be an improvement

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CHINA

Mental hospitals in the PRC use group discussions of Mao's thoughts as therapy. As yet there are no reports of using psychiatry for political purposes as in the USSR. This report of activity in the PRC has ominous portents, and abuse of psychiatry for political purposes seems to be a logical next step.

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MIDDLE EAST AND ISLAMIC

India's domestic communications satellite, INSAT 1, may have been postponed indefinitely apparently because of funding problems. INSAT 1 was to provide direct broadcast of instructional TV at the termination of an experiment conducted by NASA. NASA's ATS-6 spacecraft will provide direct TV broadcast for one year and is scheduled to begin in July 1975. India now will have to rely solely on the ATS-6 spacecraft to provide this broadcast.

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LATIN AMERICA

Brazil plans to build a pilot plant for the concentration of uranium. After a decade of exploration for uranium, Brazil now has a small uranium reserve. To build a plant for such a small quantity of uranium indicates a

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desire by Brazil to become at least partially self sufficient in its nuclear program and optimism that more extensive uranium deposits may be found in the area.

Argentina is planning to construct a heavy water production plant which would decrease significantly Argentina's dependence on foreign suppliers in its nuclear program.

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NUCLEAR ENERGY

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Brazil to Construct Commercial Uranium Processing Plant: After the inauguration of its first pilot plant for the concentration of uranium, Brazil's Minister of Mines and Energy announced that a commercial uranium processing plant also would be constructed. The commercial facility would take about 3 years to build and would produce 270 tons of uranium oxide per year. The plant will be located near Pocos de Caldas, the site of some known uranium deposits.

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Comment: After a decade of exploration for uranium, frequently with foreign assistance, the only known uranium deposit in Brazil has been located near Pocos de Caldas. The deposit is small, amounting to approximately 3,000 tons of uranium in reserve. Brazil's desire to build a concentrating plant for so small a quantity of uranium rather than purchase from abroad indicates a desire for at least partial self sufficiency for its future nuclear program and optimism that more extensive uranium deposits may be found in the area in the future.

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Argentina Plans Heavy Water Production: At a seminar given by the Argentine Atomic Energy Commission (CNEA), Rear Admiral Iraolagoitia, CNEA president, stated that the CNEA would design and build a \$5-million heavy water production pilot plant to be followed by a 400-metric-ton-per-year plant. The plant is

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expected to be operational by 1980 and the total cost is estimated to be about \$150 million.

Gerardo Videla, CNEA director for production of heavy water, admitted that Argentine industry had no experience in this field but some of the equipment and processes involved were similar to those used in the petrochemical and oil refining industries. The CNEA which has experience in the latter two areas, plans to develop heavy water production in association with petrochemical and fertilizer plant development. Videla further stated that an ammonia plant of 1,000-ton-per-day capacity also can produce 100 tons per year of heavy water.

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Comment: The construction of a heavy water production pilot plant by the CNEA would decrease significantly Argentina's dependence on foreign suppliers in its nuclear program. The CNEA has been interested since 1970 in a heavy water plant which could be built in conjunction with Petrosur's petrochemical fertilizer plant at Campana. The capacity of this heavy water plant was not stated, however, the heavy water produced would be used in the Atucha power reactor then under construction. It is not known whether or not such a facility was built. One other petrochemical fertilizer plant is now under construction at San Lorenzo. Its capacity will be 330,000 tons of ammonia per year and is scheduled to be in operation by 1976. It is conceivable that San Lorenzo will be the site for the \$5 million pilot plant proposed by the CNEA.

If the heavy water pilot plant is on line by 1977, then Argentina will be in a position to terminate the existing IAEA safeguards on the Atucha reactor because it can then replace US provided heavy water with indigenously produced heavy water. These plans for heavy water production coupled with the plans for fuel element fabrication and chemical reprocessing plant construction will result in self sufficiency in Argentina's nuclear fuel cycle and a safeguard-free source of plutonium.

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SPACE

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India's Domestic Communications Satellite INSAT 1 Program May Have Been Postponed Indefinitely: A recent failure by the Indian Space Research Organization (ISRO) to obtain further government approval may have postponed indefinitely the design development and launch of India's first domestic communications satellite INSAT 1.

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Comment: The postponement or cancellation of the INSAT program, apparently because of funding problems, could severely limit India's ambitious domestic communications satellite plans which were to include direct broadcast of instructional TV. The initial INSAT communications satellite, with a life expectancy of 7 years, would be placed in a geostationary orbit and would operate primarily in the 4- and 6-GHz bands providing direct TV broadcasts (video downlink at 2550 MHz) as well as other telecommunications functions. INSAT 1 originally was scheduled for launch in 1976 and a second phase satellite launch was planned for the early 1980s. The 1976 launch now appears out of the question.

Currently, the Indians are relying on NASA's ATS-6 spacecraft to provide direct broadcast of instructional TV. This program, called the Satellite Instructional TV Experiment, is to be a 1-year experiment scheduled to begin in July 1975. ATS-6 will broadcast 4 hours of daily TV programming directly to 5000 low cost antenna and receiver systems located in India. INSAT 1 was scheduled to continue the direct TV broadcast service after the termination of the ATS-6 experiment.

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LIFE SCIENCES

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[REDACTED] indicates that the Soviets have maintained behavioral control over dolphins working untethered in open water for the first time [REDACTED]

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The reported open ocean work may have been associated with the initial stages of an operational Soviet Navy dolphin program. [REDACTED]

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[REDACTED]
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AGROTECHNOLOGY AND FOOD RESOURCES

New Soviet Agricultural Research Center Reportedly Under Construction: A large scientific research center is under construction in the village of Osipovka, Odessa Oblast. It will help the farmers of the Black Sea area raise the yield of truck gardens by introducing progressive technology, i.e., agrotechniques for growing vegetables and melon crops, and the comprehensive mechanization of their cultivation and harvest. [REDACTED]

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Comment: When completed, this center undoubtedly will help the campaign to improve the diet of the Soviet people. Although the present annual production of vegetables in the USSR exceeds that of the US by 10 to 12 million tons, there is much room for improvement in quality and variety. Also, the advanced agricultural systems which will be researched at the center could reduce fluctuations in annual yields such as occurred in 1971 when the vegetable crop fell almost 6 percent from the 1970 level.

[REDACTED]

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BEHAVIORAL SCIENCES

PRC Mental Hospitals Use Mao's Thoughts as Therapy: The Chinese use acupuncture, counseling by other patients, drug therapy, and group therapy in political study groups to treat psychiatric patients according to a team of US scientists who visited medical schools and psychiatric facilities in Canton, Shanghai, Hangchow, Nanking, and Peking. A major therapeutic goal is to help patients merge their egos with the collected ego of the State. In order to accomplish this, the concept of nationalism, increased devotion to the community and the State, and the works of Mao, Marx and Lenin are discussed in a group setting. According to one Chinese psychiatrist interviewed, "If some patients suffer from delusion, we hold that it may be due to a confusion of the logic in their minds. Therefore, we try to educate them to think in a correct way. We arm their minds with Marxist-Leninist philosophical thinking. Chairman Mao's philosophical works will be assigned for them to read in order to let them know where the correct thinking comes from."

Comment: In the Soviet Union, psychiatry has been abused for political purposes, especially for the suppression of dissidents. There, individuals have been diagnosed as suffering from "delusions of societal reformation" and sent to psychiatric hospitals for treatment.

Although there are no reports as yet of similar abuse of psychiatry in the PRC, the material reported has ominous portents. For if educating a patient "to think in a correct way" is seen as part of psychiatric treatment, the categorization of individuals who do not think in the right way about the State as patients suffering from mental illness would seem to be a logical next step.

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SCIENTIFIC AND TECHNICAL RESOURCES

A New Mode of East European Technological Cooperation in Described: A recent Soviet commentary on technological cooperation among countries of the Council for Mutual Economic Assistance (CEMA) notes the achievements in technological and economic integration over the last 15 years in electric power production and transmission systems, oil and gas distribution, and in other enterprises. Technological cooperation in these and other fields is now being facilitated through the establishment of international associations for planning, developing, manufacturing and marketing of engineering products. These associations include Interatomenerg for atomic energy development, Interelectro for electrical product development, and other similar associations. These associations will cooperate in providing equipment and technical assistance and will permit the efficient production of high quality products for export.

Comment: CEMA's scientific and technological activities strongly reflect Soviet policies for integrating the efforts of the socialist countries. Recently, both Soviet and CEMA policies have stressed more comprehensive, long-range planning and stronger organizations for carrying out cooperative technological programs. To meet this need, the "international associations" mentioned above were created in 1973 and appear to be increasing in number. They probably were designed by the Soviets to counter independent tendencies of some of the East European countries, to establish new ties with other socialist countries, and to provide a better means to compete with Western multinational corporations and large trading firms in international trade. In the future, the CEMA countries can at least be expected to become more active in their collective and individual S&T dealings with other nations, if not more competitive.

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PHYSICAL SCIENCES AND TECHNOLOGIES

Soviets Have TV Tube Production Problems: Soviet-made anode buttons--used to connect the high voltage lead to the picture tube--are out-of-round, rusty, and the wrong size. [REDACTED]

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[REDACTED] poor quality buttons could explain much of the difficulty the Soviets appear to be having in manufacturing TV tubes. The use of improperly designed, and imprecisely machined buttons would make vacuum sealing of the tubes difficult. In turn, lack of adequate sealing could lead to implosion during evacuation and baking processes. The problem apparently is widespread since the Soviets use the same buttons for both black and white and color tubes, even though design requirements are not the same. [REDACTED]

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[REDACTED] the Soviets could be losing about 25 percent of the tubes in production. [REDACTED]

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Comment: Since implosion failures generally take place toward the end of the assembly process, the high tube failure rate leads to large economic losses, currently estimated at \$10 to \$20 million annually. Large losses are likely to continue until adequate quality control techniques and equipment are introduced into the manufacturing process. [REDACTED]

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Soviets Study Characteristics of Vertical Hydrophone Line Arrays: Acousticians at Moscow State University have reported on the directivity and noise rejection characteristics of vertical arrays of hydrophones for both isotropic and anisotropic ambient noise fields. Equations are given in both cases for arrays of ordinary omnidirectional pressure sensing elements and for arrays of dipole hydrophones. Specific computations are made for the cases of eight-element arrays of both types of hydrophones in the presence of sea surface-generated noise. Considerable noise rejection enhancement is noted from computations for the array consisting of dipole elements; no experimental data are given, however. This work was submitted for publication in early 1971. [REDACTED]

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Recent Soviet Publication in Acoustic Transducer Materials Research Indicates Little Progress: Materials scientists at the Acoustics Institute of the USSR Academy of Sciences are continuing research on ferroelectric lead-barium niobate ($\text{Pb}_{0.6}\text{Ba}_{0.4}\text{Nb}_2\text{O}_6$) in an effort to produce high-quality acoustic power transducers which is acknowledged by them as continuing to present a challenge. It is credited by the scientists as being equivalent in this application to lead zirconate-titanate. The Soviets claim that their investigations of the properties of LBN with various additives have contributed to the development of an entire series of new materials for acoustical applications.

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Comment: On numerous occasions the Soviets have claimed advantages of lead-barium-niobate over lead-zirconate-titanate and may, therefore, be using it in acoustic power transducers.

All current evidence points to the Soviets' continued use of outmoded magnetostrictive materials and, to a lesser extent, the dated ferroelectric material, barium titanate, in power transducers for operational sonars. Use of lead-barium-niobate would be a distinct improvement over either for this application, [REDACTED]

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Soviets Continue Work on Active Suppression of Hydroacoustic Fields: A scientific session of the Joint Scientific Council, Academy of Sciences, USSR, on the Complex Problem "Physical and Technical Acoustics" was held in Moscow in December 1973. Three papers on methods for suppressing mechanical noise and vibrations at their sources using active means and one paper on active suppression of echos were presented. The authors' cited affiliations were the Acoustics Institute of the Academy and the Leningrad Shipbuilding Institute. A large portion of the Soviet literature cited in these reports was published as recently as 1970. [REDACTED]

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Comment: These works are further indications of fairly recent, openly acknowledged Soviet interest in actively compensating sounds emitted by and reflected from underwater objects, [REDACTED]

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